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ABSTRACT

Joint Ventures as a Commitment Device Against Lobbies

This paper investigates a hitherto unexplored rationale for firms to enter into joint ventures. We model risky projects with autocorrelated productivity shocks as creating an option value of investing over time so that later investments benefit from the information revealed by the realization of earlier investments. However, internal and external lobbies are likely to pressurize owners into paying out early revenues from such investments precisely when the autocorrelation of productivity implies they should be reinvesting them in the project. Joint ventures provide a commitment mechanism against lobbies, thereby enabling more efficient levels of investment. We present some case study evidence that this rationale for entering into joint ventures is especially relevant in the context of infrastructure projects in developing countries, though other contexts such as pharmaceuticals are also favorable to the phenomenon. We also find that Business Environment and Enterprises Performance survey data corroborate the model's prediction that organizations under conditions favorable to internal or external lobbying pressure are more likely than other firms to choose joint ventures as their corporate governance structure.

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1 Introduction

Many projects involve cooperation between partners, often at an international level. Sometimes this cooperation is contractual - the owner of a productive asset simply sells the services it yields across international frontiers. Often, though, it takes the form of a joint venture (JV): the establishment of a corporate governance structure characterized by joint ownership, with the owners located in different firms. This is a puzzle: joint ownership is typically inefficient, because interests often diverge and strategies target different objectives among partners. So why does it happen?

The answer we explore in this paper is that joint ownership may have advantages when it commits the parties to resisting certain kinds of lobbying to expropriate the fruits of investment in the project. Joint ventures are particularly common in industries that face highly uncertain returns to investments and in which, as a result, investments tend to be spread out over time in order to benefit from the option value of learning from the success of initial investments about the prospects for later ones (note that this argument is based on option values and has nothing to do with risk aversion). The pharmaceutical industry is a good example: investments in developing new drugs are highly risky, and it is often not until well into the lifetime of a research project that it become clear whether it will be profitable or not. When initial profits appear, that is often the time at which it is necessary to plow them back into the project in order to ensure that its full potential is realized. However, it may also be precisely the time at which the project's financial backers look to receive some pay-back for their initial support. When a project is wholly-owned by a parent company it may be very difficult to resist pressures to use the cash generated by a successful project elsewhere in the company, even though the project's initial success is a signal that more money should now be invested in it rather than dividends taken out.

Joint ventures are also common in infrastructure projects, especially in developing countries. Infrastructure projects require considerable and sustained investments that are highly visible, since the infrastructure sectors have a cost structure that is typically heavily weighted towards fixed (sunk) costs. Indeed, firms may generate large operating profits while being barely able to cover fixed costs. Profits are also extremely sensitive to the regulatory and political context

in which organizations operate. They are often subjected to strong political pressures to keep prices low or other rent-seeking manoeuvres, once investments are sunk. Moreover, they often involve governments especially in developing countries and are frequently subject to severe political lobbying. Finally, weak institutions and powerful interesting groups make it even more difficult to resist political pressures to claw back profits resulting from the success of initial tranches of infrastructure investment, even if those very profits are often a signal that the very success of past investment makes further investment more important in the future. This not only reduces the profitability of past investments but also limits the funds available for future investments, which can appear difficult to justify given other claims on scarce funds.

The structure of joint ventures as a commitment device against lobbying pressure may be useful whether the decision-making organization is a firm or a government. Interest groups may exist within the firm, as in the example of pharmaceuticals (some divisions of the firm may have divergent interests from those of the Head Office or Board of Directors) or outside it (there may be political pressures, or pressures from upstream or downstream trading partners). Likewise, in the case of infrastructure projects, decision makers are often country governments and they may face internal and external lobbying, too. For simplicity, in what follows we are going to use in general the term firm, but similar arguments apply for other types of organization as well.

Arguments that some governance structures are better than others at resisting lobbying and other forms of influence-seeking are of course not new in the literature on industrial organization. Meyer, Milgrom and Roberts (1992) argued that demergers and spin-offs are often a good way for firms to lower the costs of internal influence-seeking, and since these costs are arguably higher in periods of depressed demand (since managers have lower relative benefits from devoting their energies to productive activities), we should expect to see more demerger activity in recessions than in booms. A similar logic explains why privatization by the state should be more frequent in recessions than in booms. Crémer (1995) argues likewise that 'arms-length relationships' are better at committing managers to making subordinate individuals or subsidiary divisions work hard, since they make it credible that managers can refuse to consider excuses (especially valid excuses) for poor performance. Subordinates who know that not even valid excuses will be considered favorably have even greater incentives to work hard. Such theories have so far, though, focused on the role of organizational frontiers as commitment devices, not on the

role of joint ownership. As far as we are aware, the role of the joint venture as such a form of commitment device is new to the present paper.[1] Joint ownership has, of course, been argued to have important virtues in the presence of significant investments by the parties that are specific to their continued relationship (several such contributions are reviewed below). Indeed, some form of relationship-specific investment must be necessary in our model to explain why a research project takes place within a parent firm at all rather than being a purely independent entity that transacts with the parent firm entirely through the market. But relationship-specific investments play no part in our explanation of why there is *joint* ownership of a project rather than ownership by a single parent. How can such joint ownership commit the parties to managing the project's investment profile more efficiently?

The answer is that the joint venture governance structure commits the parties to equality of treatment in respect of the revenues generated by the project. When revenues are realized the owners of the project are of course free to reinvest those revenues back into the project, or to distribute them as they see fit. Lobbying activity, we have suggested (in line with the arguments of Meyer, Milgrom & Roberts [1992]), will create a bias towards distribution and away from reinvestment. However, an economic agent who is only part-owner of the project will find that distribution become relatively expensive: choosing to distribute revenues implies a duty to distribute to the other owners as well. This greater cost may help, therefore, to redress the balance and make reinvestment relatively more attractive again.

The logic seems clear enough when it applies to industrial joint ventures in sectors such as pharmaceuticals. A wholly owned research project that starts to yield positive profits may risk being treated as a cash cow by jealous divisions in the parent company, at a potential cost to its own long-term investments needs. However, if it is jointly owned with another firm, the project's managers may more easily resist the pressures to become a cash cow, since any claims on the projects revenues by one parent have to be matched by payouts to the other parent(s).

What about infrastructure projects, where the parents of the joint venture are often sovereign governments? The logic is if anything even more important. Consider a project such as a hydro-electric power plant. The latter generally involves large sunk investments with often uncertain returns, due to uncertainties both on the cost side and on the side of demand (the latter often

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[1]Neven, Papandropoulos & Seabright (1998) set out a purely verbal form of the present argument.

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particularly difficult to predict in developing countries). If the project succeeds and generates substantial net revenues, there are likely to be major political pressures to recoup some of the benefits. This may occur through repayments of dividends to the public budget, which has many other urgent claims on the revenues generated. Or it may occur through caps on tariffs in the name of allowing the citizens (even if this means mainly rich farmers and industrialists) to share in the prosperity generated by the investments. But it is precisely at the time when the project has succeeded that it is most important to re-invest some of its earnings, both in maintenance expenditures to ensure that the benefits are maintained, and in expansion since the project's success is a positive signal that further hydro-power investments in similar conditions are also likely to be successful. Thus the political pressures set up by the project's success in the past may stand in the way of its continued success in the future.

In these circumstances a joint venture, particularly with a foreign government or firm, can play an important role in committing the project to reinvest revenues instead of paying them back under the pressures of political lobbying. First of all, repayment of dividends to the public budget would require proportional payments to be made to the joint venture partner; this would make the payouts more expensive from the point of view of the lobbyists because twice as much must be paid out to ensure the same benefits. Alternatively, if the clawing-back of the project's benefits is done not by distributing dividends but by capping tariffs, this will cost the joint venture partner, which can be expected to engage in some fierce lobbying of its own. In other words, the joint venture partner becomes a formidable source of countervailing pressure against payouts of revenues that would be better reinvested in the project. The presence of a joint venture partner, so often the source of inefficiencies in management structures (because of divergences in interests and strategies of the partners), becomes here a positive source of strength because it allows the owners of a project to commit to a consistent pattern of investment over time.

Specifically, we assume that a number of firms have the opportunity to invest in a project that yields revenue in two stages. The results of the first stage are informative about the likely results of the second stage, due to autocorrelation in productivity shocks: a project that is successful in the first round is more likely to be successful in the second round. However, in these firms there are lobbies that demand payouts, and their demands are the more vociferous

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the higher are the revenues from the first round. A successful first round therefore creates a tension: it implies a strong reason to reinvest the revenues, but it also gives rise to intense lobbying to distribute the revenues instead. As we show below, this pressure is stronger when the lobbies are ones whose goals are at least partially shared by the decision makers in the firm itself.

In this context a joint venture with one or more other firms helps the firm to resist such lobbying, not completely, but to some extent. Because in a joint venture payouts to one partner's lobbies have to be matched by payouts to those of the other partner, giving in to lobbying pressure is more expensive and less likely to occur; in response the lobbies will scale down their efforts at persuasion and waste fewer resources in such activities. Therefore, our model implies that organizations under tough internal or external pressure should tend to choose joint ventures as corporate governance structure. We find support to this prediction based on data from the European Bank of Reconstruction and Development - World Bank Business Environment and Enterprise Performance Surveys (BEEPS).

The paper is structured as follows. Section 2 reviews the literature on joint ventures in industrial organization. Section 3 sets out the model and derives the main results. Section 4 reviews some case studies of infrastructure projects in developing countries to assess the concrete relevance of the mechanisms analyzed in our theoretical framework. Section 5 illustratively investigates a crucial theoretical prediction of the model, namely that organizations under tough internal or external pressure tend to choose joint ventures, based on BEEPS data from 27 countries. Section 6 concludes.

2 Joint Ventures: A Review of the Literature

An early attempt to provide theoretical foundations for JVs is by Kogut (1988). His main contribution is based on a transactions cost framework, defined by Gibbons (2005) as a Rent-Seeking theory of the firm. Indeed, the JV structure is a vehicle whereby a particular transaction that requires relationship-specific investments can be achieved. According to Kogut, JVs allow partners solve situations with high uncertainty about the contracting parties' behavior, thanks to the unification of control rights in the new hierarchical structure.

The later arrival of the property rights theories of the firm brought new challenges. In the original property rights framework, due to Grossman & Hart (1986) or Hart & Moore (1989), the key insight is that the returns from relationship-specific investments can be appropriated by the non-investing partner; thus, ex-ante investment incentives are distorted and the classical hold-up problem arises. Since property rights theories predict that joint ownership is likely to be suboptimal, many researchers have tried to understand why joint ownership agreements are nevertheless commonly used.

One particular assumption about joint ownership agreements is that parties do make such specific investments. However, each party may also make important general investments. Cai (2003) acknowledges that firms can choose to make both kinds of investments, and that overall outcomes may depend on the trade-off between the two. The author concludes that when both types of investments are substitutes, efficient levels of relationship-specific investments can be achieved. On the other hand, when investments are complements the standard conclusion of property rights theories is that joint ownership is not optimal.

Bai, Tao & Wu (2003) construct an empirical model that includes relation-specific investments and general investments. Their econometric results, using a Chinese database of 200 JVs, are the following. First, the frequency of the partners' joint control of assets declines as the legal environment improves, and as the economic environment becomes more competitive; it increases when the investing party's probability of appropriating returns increases. Second, foreign partner control and revenue shares increase with the number of tasks assigned and with the technological complexity of each of them; on the other hand, control and revenue shares decreases when the national partner's market knowledge is important. Finally, the data support the view that general investments are more significant than relationship-specific investments for such JVs.

Within the framework of property rights theories other explanations for joint ownership have been proposed. Hauswal & Hege (2006) are interested in explaining why 50%-50%, 50% plus one, and majority ownership are the most common regimes in JVs. The authors considered a setup with just one type of investment with the novel feature that higher levels of investment erode rent-seeking activity. Indeed, it is shown that in a standard property rights model with this additional feature, these three empirically observed regimes can coexist in equilibrium, and

each can be optimal for wide set of different JVs.

A number of papers have focused on the specific case of international joint ventures (IJVs), based on the idea that they respond to the specificities of different nations' policy instruments. Moskalev & Swensen (2007), Bai, Tao & Wu (2003), and Zhao, Anand & Mitchell (2003) have shown that IJVs are common and represent a significant proportion of foreign direct investment (FDI). For example, Abe & Zhao (2005) study the impact of a country's emission taxes on the formation of IJVs or fully owned FDI. The authors stress the role of current abatement costs in the definition of the optimal tax policy. In particular, with large abatement costs IJVs are less likely, and consequently the government will impose very high taxes to foster full-ownership FDI; if abatement costs are low, the government will do better to set low taxes to foster IJVs .

According to Moskalev & Swensen (2007), between 1990 and 2000 alone 60,446 joint ventures took place around the world (Table 2). Of these 58.7% involved partners from at least two different countries. Most JVs (87.0%) had two partners, and 9.1% had three. JVs' activities tend to be highly localized. Indeed, 85% of JVs were created to serve only one market, and 8.2% were created to serve two markets. Among the JVs with only two partners, one foreign and the other national, the share of JVs created to serve two countries is higher than in the whole sample, i.e. 12.7% versus 8.2%. Finally, of those JVs with more than three partners, where at least one of them is foreign, the vast majority (90.68%) were created to serve two countries, and a smaller fraction (5.69%) for serving three markets.

The frequency of registered JVs changed during the sample period 1990-2000. Figure 2 and Table 2 shows that the number of JVs steadily increased until 1995, after which their number sharply decreased and grew subsequently at a lower rate. Different data sources confirm these facts. Figure 2 shows that JV and Merger & Acquisitions in Europe steadily increased during the 1990's, and then underwent significant oscillations until 2005. Figure 2 also shows the composition of these different types of mergers in Europe for the same time period. As Moskalev & Swensen suggest, the proportion of JVs has steadily decreased since 1995; the European data show a gradual increase in preference for a full transfer of asset ownership between firms rather than a joint ownership structure.

JVs are more common in some industries than in others. Moskalev & Swensen (2007) suggest that JVs are more common in industries where firms face higher risks. Indeed, they show that

Panel A - *Frequency of Joint Ventures (JVs)*

	N	(%)
All JVs	60446	100%
with disclosed Estimated Capitalization	4484	7.42%
with disclosed Estimated Cost	4487	7.42%
with disclosed both Estimated Capitalization and Cost	402	0.67%
JVs w/ Cross-Border Participants	35495	58.72%
Multi-regional JVs	5839	9.66%
JVs w/ Cross-Border Participants & Multi-regional	5626	9.31%
Domestic JVs	22658	37.48%

Panel B - *Number of Participants in JVs*

participants:	All JVs		JVs w/ Cross-Border		Multi-regional JVs		Domestic JVs	
	N	%	N	%	N	%	N	%
2	52597	87.02%	29626	83.47%	5152	88.23%	20793	91.77%
3	5484	9.07%	4071	11.47%	469	8.03%	1325	5.85%
4	1406	2.33%	1069	3.01%	123	2.11%	319	1.41%
5	529	0.88%	417	1.17%	56	0.96%	108	0.48%
>5 (max=20)	426	0.70%	312	0.88%	39	0.67%	113	0.50%
Total	**60442**	**100.00%**	**35495**	**100.00%**	**5839**	**100.00%**	**22658**	**100.00%**

Panel C - *Number of Countries where JVs will Operate*

countries:	All JVs		JVs w/ Cross-Border		Multi-regional JVs		Domestic JVs	
	N	%	N	%	N	%	N	%
1	51400	85.0%	28578	80.5%	-	-	22642	99.93%
2	4930	8.2%	4508	12.7%	5295	90.68%	11	0.05%
3	356	0.6%	319	0.9%	332	5.69%	2	0.01%
4	103	0.2%	92	0.3%	99	1.70%	3	0.01%
>4 (max=18)	115	0.2%	100	0.3%	113	1.94%	0	0.00%
Missing Country	3538	5.9%	1898	5.3%	0	0.00%	0	0.00%
Total	**60442**	**100.00%**	**35495**	**100.00%**	**5839**	**100.00%**	**22658**	**100.00%**

Panel D - *Form of JVs*

Form	All JVs		JVs w/ Cross-Border		Multi-regional JVs		Domestic JVs	
	N	%	N	%	N	%	N	%
Strategic Alliance	34161	56.5%	16460	46.4%	3784	64.8%	15687	69.2%
Independent JV firm	26271	43.5%	19035	53.6%	2055	35.2%	6971	30.8%
Total	**60442**	**100.00%**	**35495**	**100.00%**	**5839**	**100.00%**	**22658**	**100.00%**

Panel E - *Dollar Size of JVs*

(data are in US$ Mil)	Mean	Median	N
All Joint Ventures			
Estimated Capitalization of JV	79.07	8	4484
Estimated Cost of JV	264.56	30	4487
JVs w/ Cross-Border Participants			
Estimated Capitalization of JV	81.85	8.6	3560
Estimated Cost of JV	278.70	30	3327
Multi-regional JVs			
Estimated Capitalization of JV	88.10	9.75	388
Estimated Cost of JV	452.44	57.5	292
Domestic JVs			
Estimated Capitalization of JV	69.74	5.6	882
Estimated Cost of JV	233.63	28.45	1096
Strategic Alliance			
Estimated Capitalization of JV	138.6	20	196
Estimated Cost of JV	308.4	25.1	922
Independent JV firm			
Estimated Capitalization of JV	76.4	7.6	4287
Estimated Cost of JV	253.3	30	3563

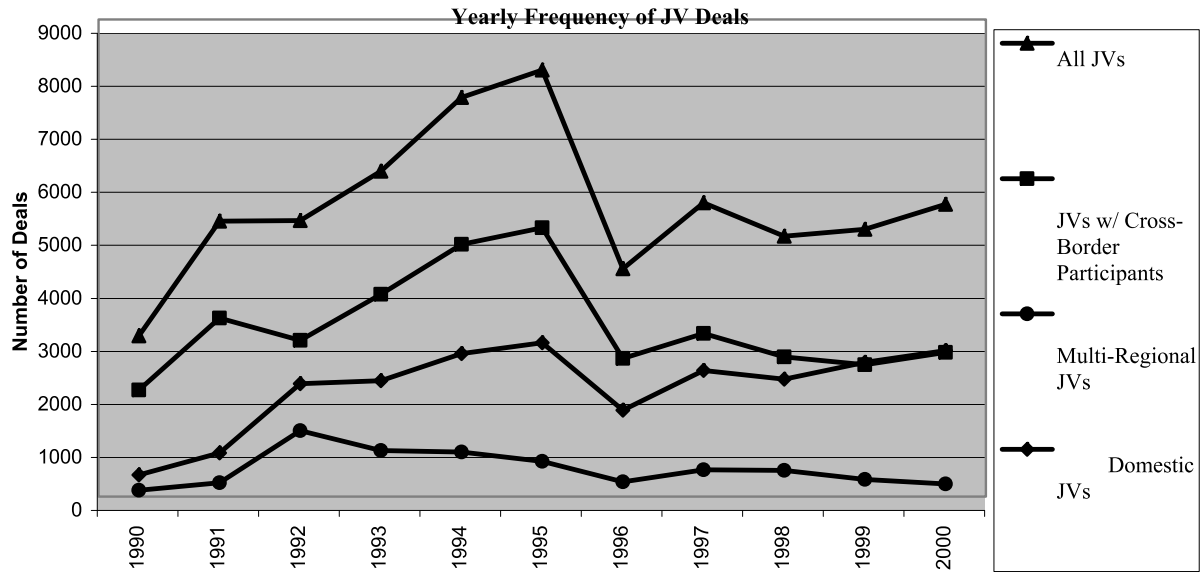Table 1: Summary Statistics for JVs. *Source: Moskalev & Swensen (2007).*

Figure 1: Frequency of JV Deals by Year. *Source: Moskalev & Swensen (2007).*

	All JVs							*JVs w/ Cross-Border Participants*						
		Est. Capitalization			**Estimated Cost**				**Est. Capitalization**			**Estimated Cost**		
Year	N	Mean	Median	N obs	Mean	Median	N obs	N	Mean	Median	N obs	Mean	Median	N obs
1990	3034	228.1	20.0	210	269.1	41.3	67	2012	263.8	17.3	163	296.1	42.0	53
1991	5193	91.1	8.8	529	181.7	34.5	236	3367	87.1	8.4	442	220.1	48.5	177
1992	5208	75.8	9.0	338	222.8	33.6	225	2945	82.3	8.9	278	215.9	52.8	167
1993	6139	90.1	10.0	711	295.4	27.7	443	3816	75.5	10.0	582	336.4	30.0	346
1994	7527	41.8	6.0	792	236.2	22.0	1005	4758	45.3	7.1	667	224.6	22.0	774
1995	8044	40.9	6.6	636	233.6	30.0	1101	5070	42.8	6.5	529	232.7	30.0	854
1996	4296	70.0	7.7	252	246.1	30.0	397	2608	79.2	7.8	214	253.1	30.0	287
1997	5540	106.5	10.0	385	304.5	50.0	363	3076	117.9	10.0	309	370.9	57.8	255
1998	4910	96.4	13.2	229	556.9	49.2	244	2635	111.5	20.0	157	690.2	54.6	176
1999	5043	86.6	5.0	160	306.4	51.3	224	2486	76.7	6.5	108	270.0	50.0	119
2000	5512	61.9	3.2	242	207.5	30.7	182	2722	100.1	4.7	111	225.0	46.8	119
Total	**60446**	**79.1**	**8.0**	**4484**	**264.6**	**30.0**	**4487**	**35495**	**81.9**	**8.6**	**3560**	**278.7**	**30.0**	**3327**

	Multi-Regional JVs							*Domestic JVs*						
		Est. Capitalization			**Estimated Cost**				**Est. Capitalization**			**Estimated Cost**		
Year	N	Mean	Median	N obs	Mean	Median	N obs	N	Mean	Median	N obs	Mean	Median	N obs
1990	121	198.6	30.0	6	340.4	269.3	4	411	106.3	28.3	44	275.3	45.2	8
1991	260	161.1	9.1	20	382.0	200.0	15	821	117.3	15.2	81	111.4	47.6	31
1992	1244	47.7	4.5	99	264.4	100.0	48	2132	50.0	10.0	54	246.8	11.3	56
1993	869	73.8	6.5	87	813.0	37.0	35	2186	167.9	10.0	118	151.8	10.1	92
1994	843	47.2	5.2	26	333.3	50.0	51	2700	23.6	3.0	125	281.7	25.5	225
1995	662	62.3	4.3	23	432.3	63.5	48	2901	32.4	6.8	105	239.4	32.0	241
1996	279	52.0	23.7	12	126.1	23.5	21	1629	18.0	7.7	38	231.4	33.0	107
1997	503	153.1	16.5	64	698.3	50.5	38	2378	57.3	4.1	68	148.6	30.9	100
1998	492	108.0	26.8	46	572.1	283.5	24	2215	65.8	7.0	69	212.0	25.2	68
1999	325	17.5	17.5	2	566.0	47.5	4	2530	109.2	3.3	51	347.7	52.5	105
2000	241	180.1	3.3	3	235.3	107.6	4	2755	29.2	2.0	129	174.5	21.0	63
Total	**5839**	**88.1**	**9.8**	**388**	**452.4**	**57.5**	**292**	**22658**	**69.7**	**5.6**	**882**	**233.6**	**28.5**	**1096**

Table 2: Size of JVs by Year. *Source: Moskalev & Swensen (2007).*

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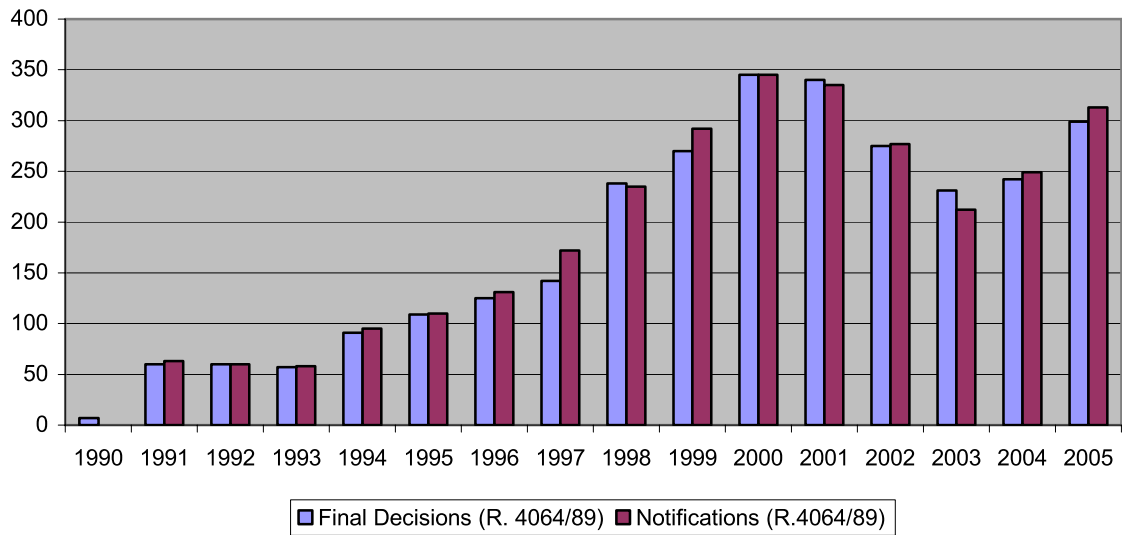
Figure 2: Number of Final Decisions over 1990-2005. *Source: Report on Competition Policy.*
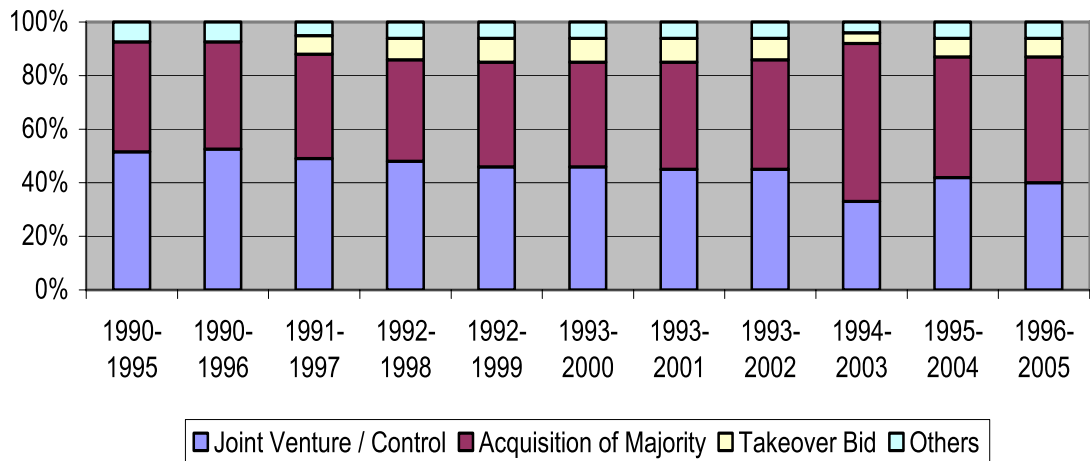
Figure 3: Participations over 1990-2005. *Source: Report on Competition Policy.*

54.5% of all JVs from 1990-2000 were concentrated in ten industries that are technologically intensive. This fact is not a coincidence; most theories of JVs will try to explain why JVs become optimal under risky environments. Similarly, the data show significant geographical clustering with 63.4% of all JVs being based only 7 countries (USA, China, Japan, UK, Canada, Australia, Germany).

In spite of their widespread prevalence, JVs are actually somewhat less common than alliances between firms. In JVs and alliances there is asset co-ownership, but while the former requires creating a new hierarchical structure, the latter allows each partner to accomplish its tasks on its own. Moskalev & Swensen argue that this might be explained by the fact alliances are less costly to dissolve than JVs. Second, partners in JVs have a preference for equal asset ownerships; this holds both for agreements between national firms, and for international joint ventures. This underlines the fact that JVs impose more symmetric and formal responsibilities on the partners than do alliances.

The United States case is widely cited in the literature. Desai, Foley & Hines (2004) examine IJVs in which US multinationals were involved between 1982 and 1997. The major finding the authors highlight is the steady decrease in the use of partial ownership agreements. This might be for several reasons. It might be cheaper to manage centrally different tax systems than to respond to each of them separately; by a parallel argument, it may be cheaper to plan a worldwide production than to coordinate each JV to achieve the same goal; finally, JVs pose a constant threat of undesired technology transfers due to weak property rights legislation.

There are also many studies that concentrate on particular US industries. Reimer (2006) studies the pork industry, in particular to explain why the share of production under an integrated structure has increased with respect to a non-integrated structure. The author appeals to incomplete contracts, arguing that upstream firms require good coordination with animal growers for their product to remain competitive. Additionally, as more and more upstream firms chooses the integrated production structure animal growers run out of options, and consequently their bargaining power decreases.

The case of industries with network externalities has also received attention. Forbes & Lederman (2006) study the patterns of JVs in the US domestic airline industry. Unforeseen events in network industries have a greater impact than in industries without these particular

externalities. For example, if in several regions the weather conditions create delays in regional flights, the nationwide airline will be seriously affected if regional airlines do not coordinate to overcome the delays. In other words, the nationwide airline must create complex contracts to make regional firms internalize coordination failure problems. Clearly, if nationwide firm own also their regional firms this problem disappears.

Forbes & Lederman's findings confirm this intuition. Not every regional airline in the US is owned by one of the nationwide airlines. But regionals that operate in areas where unexpected events are more frequent are more likely to be fully owned by major airlines. The authors also show similar findings for regionals that operate near the majors' network hubs, such as Miami for American Airlines, Atlanta for Delta Airlines, and Houston for Continental Airlines.

Zhao, Anand & Mitchell (2003) uses the case of IJVs in the Chinese automobile industry to investigate the degree of inter-organizational R&D transfers. Using qualitative data obtained from direct interviews and visits to joint R&D centers the authors conclude that R&D transfers can only be achieved by doing joint R&D activities. Also they conclude that technology transfers have two dimensions, one that involves appropriating a specific type knowledge, and other that involves appropriating a general competence from the foreign partners.

Previous studies on R&D transfers showed that the foreign party in IJVs was reluctant to share its technology due to weak property rights legislation. Jiang (2007) asked about the relationship between ownership structure and technology transfers, and about how the literature's previous results have changed since China's participation in the WTO. The study has two major findings. First, technology transfers were more likely in IJVs where the foreign partner had a bigger ownership share. This result suggests that in the optimal IJV contract there is a trade-off between project risk and technology spillovers. And second, there is evidence that technology transfers increase with a higher degree of Chinese market competition.

Beside the cases of Europe, US, and China, the empirical literature also refers to many other countries or regional cases. For example, Dubcovsky & Garcia (1996) study JVs, Mergers & Acquisitions in Mexico between 1993 and 1994. They showed that Mexican firms in JVs faced abnormal returns two days before and after the announcement, but this was not the case for US firms. For Mergers & Acquisitions, both Mexican and US firm faced abnormal returns. The authors interpret these results as suggesting that US firms are more willing to get involved in

full asset ownership agreements.

Lastly, Ozawa (2006) studies the relationship between equity participation and investment decisions in Japanese groups. Besides confirming the relationship between investment decisions and equity holdings, the paper argues that Japanese firms after World War II faced serious financial constraints that did not allow them easily to raise capital in financial markets; thus, regulation on financial markets is largely responsible for keiretsus' ownership structure.

Although the papers in this literature have provided many important insights into the motives for forming joint ventures, especially in the presence of specific investments, none of them has investigated the role of rent-seeking and lobbying in the absence of such investments. In the model to be developed in section 3, there are no investments that are specific to the relationship between the parents of the JV, but joint ventures will nevertheless play a crucial role in providing incentives for efficient investment. The reason is that joint ventures provide a commitment mechanism that makes giving in to lobbying pressures more expensive for the owner of a project. It is to this model that we now turn.

3 The Model

There are M firms, $i = 1, ..., M$.[2] In each firm there are n lobbies $n_i = 1, ..., n$.[3]

There are four time periods, $t = 0, 1, 2, 3$. Period 0 is when the rules are made and decisions taken about whether or not to form joint ventures. Decisions about resource allocation take place in periods 1 and 2. Period 3 is when final profits are enjoyed. To fix ideas, call period 0 the 'set-up' period, period 1 the 'initial investment' period, period 2 the 'follow-up investment' period, and period 3 the 'results' period.

We begin with the strategies and payoffs of firms in the absence of lobbies. That is, we consider what the project should and would do if its investment and other decisions could be made without any pressure from lobbies. We consider later what effect lobbies have on these decisions, and how firms will behave differently when they know lobbies are active.

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[2]As explained in section 1, the term firm is used as a shortcut to indicate the decision maker of a firm or of another type of organization. For instance, in the case of JV for infrastructure projects, national or local governments are likely to own part of the project, especially in developing countries.

[3]As illustrated in the Introduction, the term lobbies designates groups either internal or external with respect to the organization, whose interests are not aligned with those of the firm.

3.1 Investment without lobbies

We set out here a simple framework in which each firm makes an investment in period 1 and another in period 2, after it has observed the results of the first investment. We allow for the possibility that the time lag between investment and results may be different for investment in period 1 and in period 2. The results of period 1 investment are informative, because the higher the returns to the first investment the higher are likely to be the returns to the second. Specifically, the productivity of the investments are correlated by a factor θ which we define formally below. This means that a firm that has had good results in the first period will want to invest more in the second. For instance, if a hydro project has been built on time and under budget, and if indeed it has provided power to a large number of users who previously were under-connected, this suggests that it is worth investing in the project's maintenance, and that it may also be worth building further hydro projects in similar conditions.

However, investment in each period must come at the expense of more immediate uses of the funds. This is just the same as saying that there is a budget constraint in each period. This budget constraint creates a tension: as we shall see later when we introduce lobbies, the circumstances when investment requirements are high are precisely those in which the pressure to pay out profits are also high.

The way to state these assumptions formally is as follows. At $t = 1, 2$ each firm makes investments $k_i^t \geq 0$ costing $bk_i^t + d\left(k_i^t\right)^2$ which result in output Q_i^t one period later, namely at $t = 2, 3$. The cost function is strictly increasing and strictly convex so $b, d > 0$.

Output depends on investment and on a random productivity shock as follows. Investments made in period 1 give rise to output in period 2 according to the following production function:

$$Q_i^2 = \theta_i^1 k_i^1 \tag{1}$$

where θ_i^1 is an initial productivity shock distributed on $\left[\underline{\theta}, \overline{\theta}\right]$ with an expected value of $H > 1$.

Productivity shocks are autocorrelated, which makes expected returns on investment in period 2 depend on the realization of the productivity shock in period 1. In addition we assume capital is durable, so that investments made in period 1 lead to output in period 3 as well as in period 2 (nothing of importance in the qualitative results turns on this assumption). Thus

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output in period 3 is given by the following production function:

$$Q_i^3 = \theta_i^2 \left(k_i^1 + k_i^2 \right) \tag{2}$$

where θ_i^2 is a second productivity shock and $\mathbb{E}\left(\theta_i^2 \mid \theta_i^1\right) = \theta\theta_i^1$.

Each firm has an initial endowment E_i^1 out of which it finances period 1 investment; period 2 investment must be financed out of period 2 output. Normalizing output price to 1, this lead to budget constraints for the three periods as follows:

$$bk_i^1 + d\left(k_i^1\right)^2 + \pi_i^1 = E_i^1 \tag{3}$$

$$bk_i^2 + d\left(k_i^2\right)^2 + \pi_i^2 = Q_i^2 \tag{4}$$

$$\pi_i^3 = Q_i^3 \tag{5}$$

Firms are risk-neutral. Each firm maximizes the expected weighted sum of profits $\Pi = \pi_i^1 + \beta\pi_i^2 + \beta\gamma\pi_i^3$ subject to the constraints (1), (2), (3), (4), (5), and to the non-negativity constraints $k_i^1, k_i^2, \pi_i^1, \pi_i^2, \pi_i^3 \geq 0$. Note that the discounting of profit between period 1 and period 2 involves a discount factor β, while discounting between period 2 and period 3 involves a discount factor γ. There is no inconsistency in this, just a recognition that the lapse of time involved in realizing the fruits of the initial investments may not be the same as that involved in realizing the fruits of the second round of investments.

Our first result concerns the optimal choice of investments that each firm would make in the absence of lobbying activity. We begin by considering the optimal choice of investments without lobbies, solving the model backwards as usual, beginning in period 2 and then, assuming that the firm anticipates what it will do in period 2, solving the model for period 1.

Optimization at period 2 requires: $Max_{k_i^2}\mathbb{E}\left[\pi_i^2 + \gamma\pi_i^3 \mid \theta_i^1\right]$ subject to (1), (2), (4), and (5). This is equivalent to:

$$Max_{k_i^2}\left[\theta_i^1 k_i^1 - bk_i^2 - d\left(k_i^2\right)^2 + \gamma\theta\theta_i^1\left(k_i^1 + k_i^2\right)\right]$$

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for which the first order condition is:

$$k_i^2 = \frac{\gamma\theta\theta_i^1 - b}{2d} \qquad (6)$$

Optimization at period 1 therefore requires:

$$Max_{k_i^1} \mathbb{E}\left\{ E_i^1 - bk_i^1 - d\left(k_i^1\right)^2 + \beta\left[\theta_i^1 k_i^1 - bk_i^2 - d\left(k_i^2\right)^2\right] + \beta\gamma\left[\theta\theta_i^1\left(k_i^1 + \frac{\gamma\theta\theta_i^1 - b}{2d}\right)\right]\right\}$$

for which the first order condition is $k_i^1 = \frac{\beta H(1+\gamma\theta) - b}{2d}$.

We summarize these findings in the following Proposition:

Proposition 1. *In the absence of lobbying, each firm chooses investment levels in periods 1 and 2 given by $k_i^1 = \frac{\beta H(1+\gamma\theta) - b}{2d}, k_i^2 = \frac{\gamma\theta\theta_i^1 - b}{2d}$. Both investment levels are decreasing in the level and concavity of the cost of investment and increasing in the autocorrelation of productivity shocks as well as in the discount factor γ. In addition first-period investment is increasing in expected productivity and in the discount factor β, while second-period investment is increasing in the realization of the first-period productivity shock.*

It is important to note that optimal investment is greater when first-period output is high, not because of profit-smoothing considerations (since utility is linear in profit) but rather because of the auto-correlation in productivity. However, it is precisely this which causes problems once lobbies enter the picture, since lobbies will assume that high output provides opportunities for high payouts.

3.2 Introducing lobbies

Now suppose that for each firm there exist n lobbies $n_i = 1, ..., n$. For simplicity we assume the number of lobbies is the same for each firm, though as will be seen nothing in the argument depends on this. Each lobby can ask for a payout p_i^n at period 2, to be paid out of the output produced by investments in period 1. Before asking for its payout the lobby can invest resources r_i^n in 'persuasion'. It may lobby politicians and regulators directly, or it may engage in high-profile campaigning in the press designed to pressurize the firm into accepting that the profits of the project should be 'returned to the people'. The effect of persuasion is to make the request

'hard to refuse'. Formally we assume that lobbying imposes a cost $\lambda k_i^2 r_i^n$ of refusal, which is increasing in k_i^2 as well as in r_i^n. The idea is that the more the firm is investing in the project the harder it is to justify refusing the lobby's request. The variable λ captures the 'effectiveness' of lobbying. If it is too low, the lobbies will not invest in lobbying at all, but we shall see that once it is above a certain threshold they all do so, and as a result the firm invests less in the second period.

We can therefore rewrite the second-period budget constraint as:

$$bk_i^2 + d\left(k_i^2\right)^2 + \pi_i^2 = Q_i^2 - a_i p_i^n - (n - a_i)\lambda k_i^2 r_i^n \tag{7}$$

where a_i is the number of payout requests that the firm accepts.

The lobby's payoff function is simply the expected value of payouts minus investments in persuasion. We also modify the payoff function of each firm by assuming that it internalizes some proportion α of the benefits to the lobbies. We can describe the parameter α as the extent to which the firm 'sympathizes' with the aims of the lobbies. We shall see that, paradoxically, the more sympathetic the firm is to the lobbies' aims the harder it finds to resist their requests, and therefore the more inefficiently it chooses investment levels.

The objective function of the firm therefore becomes:

$$\Pi = \pi_i^1 + \beta\left(\pi_i^2 + \alpha a_i p_i^n\right) + \beta\gamma\pi_i^3 \tag{8}$$

The time-line of the actions is therefore as follows:

- Period 1: Firms choose levels of investment k_i^1.

- Period 2: Output Q_i^2 is realized, then lobbies choose how much r_i^n to invest in persuasion, and request a payout p_i^n.

- Period 2′: Firms then decide whether to grant the payout or not, and choose levels of investment k_i^2.

- Period 3: Output Q_i^3 is realized.

We can then solve the model as before, but this time taking the actions of lobbies into account.

First it is evident that in period 2 each lobby asks for the maximum payout that the firm will give. That is:

$$(1 - \alpha) p_i^n = \lambda k_i^2 r_i^n \tag{9}$$

Thus, we can re-write the firm's period 2 optimization as:

$$Max_{k_i^2} \mathbb{E} \left\{ \pi_i^2 + \alpha a_i p_i^n + \gamma \left[\theta_i^2 \left(k_i^1 + k_i^2 \right) \right] \mid \theta_i^1 \right\}$$

subject to $a_i = n$, and to equations (7), (1), and (9), which is equivalent to

$$Max_{k_i^2} \left\{ \theta_i^1 k_i^1 - b k_i^2 - d \left(k_i^2 \right)^2 - n \lambda k_i^2 r_i^n + \gamma \theta \theta_i^1 \left(k_i^1 + k_i^2 \right) \right\} \tag{10}$$

for which the first order conditions are:

$$k_i^2 = \frac{\gamma \theta \theta_i^1 - n \lambda r_i^n - b}{2d} \tag{11}$$

We now consider the choice of r_i^n by the lobbies. Each lobby $Max_{r_i^n} (0, p_i^n - r_i^n)$, which is equivalent to:

$$Max_{r_i^n} \left(0, \frac{\lambda r_i^n \left(\gamma \theta \theta_i^1 - n \lambda r_i^n - b \right)}{2d (1 - \alpha)} - r_i^n \right) \tag{12}$$

for which the first order conditions at an interior solution are $\frac{\lambda \left(\gamma \theta \theta_i^1 - 2n \lambda r_i^n - b \right)}{2d(1-\alpha)} = 1$, implying that:

$$r_i^n = Max \left[0, \frac{\lambda \gamma \theta \theta_i^1 - \lambda b - 2d (1 - \alpha)}{2n \lambda^2} \right] \tag{13}$$

Note that $r_i^n > 0$ if and only if $\lambda > \frac{2d(1-\alpha)}{\left(\gamma \theta \theta_i^1 - b \right)}$.

The choice of investment in period 2 is given by:

$$
\begin{aligned}
k_i^2 &= \frac{\gamma \theta \theta_i^1 - b - Max \left[0, \frac{1}{2\lambda} \left(\lambda \gamma \theta \theta_i^1 - \lambda b - 2d (1 - \alpha) \right) \right]}{2d} \\
&= \frac{\gamma \theta \theta_i^1 - b}{2d} - Max \left[0, \frac{\lambda \left(\gamma \theta \theta_i^1 - b \right) - 2d (1 - \alpha)}{4d\lambda} \right]
\end{aligned}
\tag{14}
$$

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Comparing it to the efficient level (6) we can see that investment is lower than the efficient level if and only if $\lambda > \frac{2d(1-\alpha)}{\left(\gamma\theta\theta_i^1-b\right)}$, and it is lower by the amount $\frac{\lambda\left(\gamma\theta\theta_i^1-b\right)-2d(1-\alpha)}{4d\lambda}$.

Note also that if the choice of persuasion by lobbies had been made in period 1, before θ_i^1 were realized, the choice of r_i^n would have been:

$$r_i^n = Max\left[0, \frac{\lambda\gamma\theta H - \lambda b - 2d\left(1-\alpha\right)}{2n\lambda^2}\right] \tag{15}$$

which is qualitatively similar to the choice of persuasion actually made in period 2 (13), except that if $\lambda > \frac{2d(1-\alpha)}{(\gamma\theta H - b)}$ the lobbies would always have invested in persuasion, whereas in fact they may do fail do so for low realizations of θ_i^1 if $\lambda < \frac{2d(1-\alpha)}{(\gamma\theta\underline{\theta}-b)}$.

Replacing (1) into (7), (2) into (5), (3), and (13) into (8), firm's optimization at period 1 now requires:

$$Max_{k_i^1}\mathbb{E}\left\{\begin{array}{c} E_i^1 - bk_i^1 - d\left(k_i^1\right)^2 + \\ +\beta\left\{\theta_i^1 k_i^1 - bk_i^2 - d\left(k_i^2\right)^2 - n\lambda k_i^2 \cdot Max\left[0, \frac{\lambda\gamma\theta\theta_i^1-\lambda b-2d(1-\alpha)}{2n\lambda^2}\right]\right\} + \\ +\beta\gamma\left[\theta\theta_i^1\left(k_i^1 + k_i^2\right)\right] \end{array}\right\} \tag{16}$$

subject to (14), for which the first order condition is still $k_i^1 = \frac{\beta H(1+\gamma\theta)-b}{2d}$.

We summarize these results in the following Proposition:

Proposition 2. *If $\lambda > \frac{2d(1-\alpha)}{\left(\gamma\theta\theta_i^1-b\right)}$, the presence of lobbies induces investment in persuasion by each lobby equal to $r_i^n = \frac{\lambda\gamma\theta\theta_i^1-\lambda b-2d(1-\alpha)}{2n\lambda^2}$, which is increasing in first-period productivity shock, in the autocorrelation of productivity, and in the degree to which the firm internalizes the payout to the lobbies. It also reduces k_i^2 below the efficient level by an amount $\frac{\lambda\left(\gamma\theta\theta_i^1-b\right)-2d(1-\alpha)}{4d\lambda}$ which is increasing in these same parameters. First-period investment is unaffected by the presence of lobbies, and both total investment in persuasion and the reduction in second-period investment are independent of the number of lobbies.*

It is striking that lobbying has a more damaging effect on investment in the project if the lobbies are ones with which the firm sympathizes. It is also worth noting that additional lobbies do not affect the total amount of lobbying activity: more lobbies just undertake less investment each, with the same overall results. This latter finding might be different with a differently

specified model, but the result that lobbies with which the firm has more sympathy do more damage to investment is a result that seems to be quite general. It is hard to resist pressure from people you like!

3.3 The effect of joint ventures

What is the effect of a joint venture? The time-line of the actions is in this case as follows:

- Period 0: Firms decide whether or not to form joint ventures.

- Period 1: Firms choose levels of investment k_i^1.

- Period 2: Output Q_i^2 is realized, then lobbies choose how much r_i^n to invest in persuasion, and request a payout p_i^n.

- Period 2′: Firms then decide whether to grant the payout or not, and choose levels of investment k_i^2.

- Period 3: Output Q_i^3 is realized.

Consider a joint venture among M partners. This obliges a part owner to make a payout to the partner each time it chooses to make a payout to itself. This makes payouts more expensive to the firm, and makes it more expensive to the lobby to invest in persuasion. To see this, note that the cost to the firm of granting a payout p_i^n to lobby n_i is now Mp_i^n, and furthermore this second payout benefits recipients whose utility does not enter at all into the firm's objective function. This reduces the maximum payout that the firm will be willing to grant:

$$(M - \alpha)\, p_i^n = \lambda k_i^2 r_i^n \tag{17}$$

This means that the period 2 objective function of the firm becomes:

$$Max_{k_i^2} \left[\theta_i^1 k_i^1 - bk_i^2 - d\left(k_i^2\right)^2 - \frac{n\lambda k_i^2 r_i^n (1 - \alpha)}{(M - \alpha)} + \gamma\theta\theta_i^1 \left(k_i^1 + k_i^2\right) \right] \tag{18}$$

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for which the first order conditions are:

$$k_i^2 = \frac{\gamma\theta\theta_i^1 - n\lambda r_i^n\left(\frac{1-\alpha}{M-\alpha}\right) - b}{2d} \tag{19}$$

The lobbies' problem becomes:

$$Max_{r_i^n}\left\{0, \frac{\lambda r_i^n\left[\gamma\theta\theta_i^1 - n\lambda r_i^n\left(\frac{1-\alpha}{M-\alpha}\right) - b\right]}{2d\left(M-\alpha\right)} - r_i^n\right\} \tag{20}$$

for which the first order condition is $\frac{\lambda\left[\gamma\theta\theta_i^1 - 2n\lambda r_i^n\left(\frac{1-\alpha}{M-\alpha}\right) - b\right]}{2d(M-\alpha)} = 1$, implying that:

$$r_i^n = Max\left[0, \frac{\left(\lambda\gamma\theta\theta_i^1 - \lambda b - 2d\left(M-\alpha\right)\right)\left(M-\alpha\right)}{2n\lambda^2\left(1-\alpha\right)}\right] \tag{21}$$

so that if $\lambda > \frac{2d(M-\alpha)}{\gamma\theta\theta_i^1 - b}$:

$$k_i^2 = \frac{\gamma\theta\theta_i^1 - b}{2d} - Max\left[0, \frac{\lambda\left(\gamma\theta\theta_i^1 - b\right)}{2d} - \left(M-\alpha\right)\right] \tag{22}$$

which is strictly higher than without the joint venture whenever the presence of lobbies reduces investment below the efficient level.

The following Proposition summarizes the results of forming a joint venture and shows how they vary according to the parameter λ that measures the effectiveness of lobbying.

Proposition 3. *In the presence of lobbies, a joint venture between M firms results in second-period investments k_i^2 that compare with those undertaken by firms acting in the absence of the joint venture as follows:*

a) When $\lambda \leq \frac{2d(1-\alpha)}{\gamma\theta\theta_i^1 - b}$, investment levels are efficient with or without the joint venture;

b) When $\frac{2d(1-\alpha)}{\gamma\theta\theta_i^1 - b} < \lambda \leq \frac{2d(M-\alpha)}{\gamma\theta\theta_i^1 - b}$, investments are efficient with the joint venture but below the efficient levels without the joint venture;

c) When $\lambda > \frac{2d(M-\alpha)}{\gamma\theta\theta_i^1 - b}$, investment levels with the joint venture are below the efficient level but above those without the joint venture.

What this Proposition shows us is that if lobbying is relatively ineffective, joint ventures are unnecessary. If lobbying is somewhat effective, joint ventures can prevent it from having any effect on investment. If it is highly effective, joint ventures can limit the damage done by lobbying to investment, but not avoid such damage altogether. These results suggest therefore that joint ventures may be more appropriate for firms whose ability to commit themselves is particularly weak. In the case of infrastructure projects in developing countries, where governments' commitment ability is often very limited, the above theoretical prediction is especially relevant.

Interestingly, although the number of lobbies has no impact on the behavior of firms, the number of joint venture partners is positively related to second-period investment. This has an interesting implication for the role of symmetry in the distribution of the benefits of the arrangement. Asymmetric joint ventures will be less effective as commitment device than symmetric ones, for a very simple reason. This is that in an asymmetric joint venture the partner with the largest share will act as though it was a partner in a joint venture with fewer than M partners. Therefore λ is more likely to exceed the upper bound in condition $b)$ of Proposition 3, so that investment levels are more likely to fall below the efficient level. We shall see that this finding is supported by some empirical in some case studies examined in section 4.

4   Infrastructure projects and the role of joint ventures in developing countries

In this section we review some case studies of infrastructure projects in developing countries. The aim is to assess the concrete relevance of the mechanisms analyzed in the theoretical framework developed in the previous section. We investigated about thirty-five cases of infrastructure projects mainly in sectors like natural resources and renewable energies across the African, American and Asian continent. More than two third of these projects were or still are run by a JV. Among those, the role played by reinvestment and by reputation of credible commitment are seldom explicitly mentioned, but it is likely to be understood. In more than one third of infrastructure JVs we found some evidence that lobbying pressure is a problem. When JVs are characterized by asymmetric benefits from profits generated by infrastructures,

lack of commitment arises in all the cases we have analyzed.

The model suggests that the corporate governance structure of JV may contribute to the success of a project by committing the parties to equality of treatment with respect of the profit generated by a project. When revenues are realized and the owners of the project choose whether to distribute them or to reinvest them back into the project, the distribution option is relatively less attractive than in the case of a unique parent company that wholly-owns the project. The success of the project is enhanced for two reasons. First, investment per se tends to improve the likelihood that a project is doing well. Second, the enhanced credibility in committing to adequate reinvestment makes the initial undertaking of the project more likely.

In particular, good reputation acquired through successful projects fosters the development of new infrastructure projects. One important case is likely to be the contribution of a successful outcome of the Inga III project, run by the JV WestCor, for the development of the Grand Inga, a hydro-electric plant in the western part of the Democratic Republic of Congo (about 300 km from Kinshasa and 165 km from the mouth of the Congo River). The Grand Inga would have a potential capacity of 40GW and would be capital for the future of Africa.

The importance of reinvestment in infrastructure projects is evident in the rehabilitation of the hydro-electric plants Inga I and II. The run-of-river Inga I plant was commissioned in 1972 and Inga II followed a decade later. However, both have fallen into disrepair, partly due to civil war, and now only manage to produce about one quarter of their joint capacity of 1.7GW. The little power they generate is devoted to the mines of Katanga and does not reach local people in a country where 92% of the population is without electricity. While the first revenues from the rehabilitation program are expected by late 2008, reinvestment is necessary in the subsequent three years to complete the rehabilitation project. In fact, the project expects one additional turbine to be on stream in each successive year until 720MW production is reached in 2011. The project is run by a JV between the Canadian MagEnergy, a subsidiary of MagIndustries, and South Africa's Industrial Development Corporation (IDC). Indeed, such corporate governance structure may provide the needed commitment device for adequate reinvestment.

Similarly, the infrastructure project of Bujagali needs credibility of commitment to sustained investments over about four years. It consists in the development, construction, and maintenance of a run-of-the-river power plant on the River Nile as it flows through Uganda from Lake

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Victoria towards the Sudanese border. Eight kilometers north of the existing Nalubaale and Kiira power plants, it would recycle the water flows released from these upstream hydro-power facilities to generate additional electricity reaching a production of 250MW in one of the countries with the lowest rates of electrification in the world (only 5% of Ugandans have access to electricity at home). The US$ 799 million project would be undertaken by Bujagali Energy Limited, a JV between the US-based Sithe Global Power and the Kenyan Industrial Promotion Services. The proposal is under review by the Ugandan government and by the World Bank Group and other potential lenders. The fact that Bujagali infrastructure project would be managed by a JV may contribute to its success, by providing the necessary credibility of commitment.

Credibility is badly needed because of the project's prior history. Bujagali was first conceived in 1994 and was supposed to deliver power by 2004, but failed because of political interference and corruption. In 2002 the US-based Applied Energy Services (AES) uncovered a bribery scandal and a wrangle erupted over compensation funds. AES's main contractor is alleged to have bribed an Ugandan government official in 1999. The Wall Street Journal reported that former Energy minister Richard Kaijuka, who then represented Uganda as a sub-regional alternate director on the World Bank board, had been accused in Ugandan newspapers of taking a bribe on the dam. The following year two construction firms participating in the project pulled out due to bribery and environmental controversies. Such cases are not unusual: a similar instance is the Yacyretá hydro-power project in Paraguay, which suffered more than ten years of delay due to regional maneuvering, lobbying by the Argentine nuclear and oil industries, and political instability in Argentina.

An example elsewhere in the region suggests that a joint venture structure may be helpful. In Chile good progress in the construction of the 155MW La Higuera hydro-plant, which started in 2005 and is expected to come on line in 2010, is not only crucial for the success of the project itself, but also for building a reputation of credibility of commitment necessary to undertake the project of another power plant. The final goal would be to generate 300MW of clean renewable energy each year through a two-stage split scheme: after completion of La Higuera plant, another power plant would be built upstream, La Confluencia, to generate the remainder of the energy. The fact that La Higuera project is undertaken by the Chilean power generator

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Tinguiririca Energia, a JV formed in 2004 between Pacific Hydro Chile and the Norwegian Statkraft Norfund Power Invest may provide the credibility of commitment necessary to the success of the project. Then, the reputation built thanks to La Higuera could foster further infrastructure projects.

Another example of the importance of the ability to build up a reputation of credibility is the potential development of Inga's hydro-power infrastructures. The next stage, known as Inga III, is indeed under consideration by WestCor, a JV which includes the power utilities of the DRC (SNEL), Angola (ENE), Namibia (Nampower), Botswana (BPC), and South Africa (Eskom). The construction of Inga III is expected to start around the end of 2010 and it would come on line in 2018 with a capacity of 4.3GW. An agreement between shareholders was signed at the end of 2005 such that each participating utility agreed to own 20% of WestCor. Each committed US$ 100,000 to be used for the funding of feasibility studies. The success of the rehabilitation project at Inga I and II plays of course an important role in convincing investors. The corporate governance structure of a JV between MagEnergy and IDC running the rehabilitation project seems to have played a part in contributing to a reputation for credibility.

In turn, the JV structure of WestCor may contribute in providing to Inga III project sufficient reinvestment credibility for it to be undertaken. Commitment ability is particularly important because several countries would participate, each one under the influence of different lobbying groups and probably with non-aligned objectives. This may threaten the undertaking and the success of Inga III.

The failure of the Inga III project would be particularly harmful because it would reduce investors' confidence in the Grand Inga project, which is capital for Africa. The final stage of Inga, known as Grand Inga, is in fact conceptualized at about 40GW. The project will be approved or rejected in 2014. If realized, it would be the world's biggest hydro-power generator. The project has been on the continent's electricity agenda for more that three decades. However, the potential confluence of several favorable circumstances may contribute to its undertaking. Besides other crucial circumstances, the credibility of WestCor in committing against rent-seeking by lobbying groups could contribute to the undertaking of the project.

An equal sharing of costs and benefits is crucial in providing incentives against distribution of early revenues or ex post expropriation. However, as we discussed in the context of Proposition

3, asymmetry in the shares of the parent firms may weaken the ability of the JV structure to provide a commitment device.

Itaipú Binacional in Paraguay, for example, is a JV between Paraguay and Brazil. This hydro-plant, located on one of the world's five largest river systems, is capable of generating 14GW of electricity and was the world's largest hydro-electric power plant. At the time of construction, Brazil bore most of the costs in terms of financial and technical contributions. Both countries signed an accord on repayment of Itaipú and that agreement envisaged that no profit would be distributed until the loan were completely paid off. Initial arrangements benefited Brazil in that they stated that each country has the right to use 50% of the energy produced, but if not, the excess must be sold to the other partner at a price related to production cost. Because Paraguay uses only a tiny fraction of its power (about 7%), it sells most of its share back to Brazil at a predetermined low rate. Brazil purchases 97% of the plant's power, which accounts for about 20% of its energy consumption. The major debate over Itaipú in the late 1980s revolved around the low prices that the countries had negotiated in the original treaty. After twelve years of indecision about how to adjust the treaty of Itaipú, in 1985 Paraguay and Brazil signed five revisions to cover matters of financial compensation. Paraguay gained significantly from the 1985 revisions, but most analysts believed Paraguay deserved still greater compensation for its electricity. In less than a decade the loan will be paid off so that each country would be free to charge market prices. However, President Lugo has threatened to end the contractual obligations that require Paraguay to sell its unused electricity to Brazil at well below the market rate, and seeks to earn seven times more from Itaipú energy.

Something similar happens between Paraguay and Argentina for the hydro-plant of Yacyretá. While none of the electricity produced by Yacyretá was intended for use by Paraguayans, the energy that it produces provides 15% of the total energy demanded in Argentina. In the words of a BBC reporter 'Argentina has good reason to be worried too, as it has its own Yacyretá hydro-electric JV with Paraguay'.

The asymmetry in benefits from infrastructures dramatically weakens the commitment ability of the parties not to lobby for benefits ex post. The lack of commitment in turns hinders the undertaking of new infrastructure projects. If Paraguay decides to break Itaipú's contractual obligations with Brazil, several projects along the Río Paraná will be threatened. These

include the Corpus plant, expected to be comparable in size to Yacyretá, and several smaller hydro-electric power plants downstream from Yacyretá, including Itatí-Itá-Corá and others.

5   Evidence from Business Environment and Enterprise Performance Surveys

This section illustratively investigates some predictions of the model, based on a large dataset of firms interviewed in the context of the European Bank of Reconstruction and Development - World Bank Business Environment and Enterprise Performance Surveys (BEEPS).

The objective is to shed light on the reasons why firms may choose the corporate governance structure of joint venture. Our dependent variable takes the value one when a firm was established as a JV with private partner(s) or has agreed to form a JV in last 3 years. More than 10% of firms in the dataset are joint ventures.

We consider data from 28 countries[4] in the regions of CIS, Baltic, Eastern-Central and Southern-Eastern Europe and 4 waves (1999, 2002, 2004, and 2005) for a total of 19,130 observations.

Our theoretical framework suggests that JVs can provide a commitment device against lobbying. Therefore, we would expect the corporate governance structure of JV to be more often chosen by firms that feel severe pressure either from outside the organization or from other interest groups inside it.

A simple exploration of the data reveals that JVs do indeed tend to differ from other firms in some dimensions, as shown in Table 3. Concerning the external environment, JVs in our sample have a slightly worse perception of courts than other firms. On average, they perceive them as less fair and quick, more corrupt, and less able to enforce contracts.[5] Indeed, they deal more often with the judicial system both as plaintiff and as defendant, and 63% of JVs had to

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[4]Russia, FYROM, Serbia and Montenegro, Albania, Croatia, Turkey, Bosnia and Herzegovina, Slovenia, Poland, Ukraine, Belarus, Hungary, Czech Republic, Slovak Republic, Romania, Bulgaria, Moldova, Latvia, Lithuania, Estonia, Georgia, Armenia, Kazakhstan, Azerbaijan, Uzbekistan, Tajikistan, and Kyrgyz Republic. Interviewed firms operate in different sectors: manufacturing; construction; real estate, renting and business services; wholesale, retail, repairs; hotels and restaurants; transport storage and communication; and mining and quarrying.

[5]A firm is considered to perceive the court system as respectively fair and impartial, honest and uncorrupted, quick, and able to enforce its decisions when it states that this is frequently, usually or always the case.

Table 3: Characteristics of Sampled Firms by Corporate Governance Structure.

	Corporate governance structure:			Total
	not JV	JV	Difference	
number of firms	17,087	2,043		19,130
confident in legal system	9,550	1,145	8,405	10,695
fair and impartial	5,489	620	4,869*	6,109
honest and uncorrupted	5,424	613	4,811	6,037
quick	2,846	319	2,527	3,165
able to enforce its decisions	6,810	787	6,023	7,597
mean cases in courts as a plaintiff	1.38	2.60	-1.22***	1.50
	(4.80)	(2.20)	(0.14)	(5.10)
mean cases in courts as a defendant	0.41	0.80	-0.39***	0.45
	(7.20)	(3.14)	(0.06)	(2.31)
any overdue payments to resolve	8,053	1,157	6,896***	9,210
member of business association	7,741	1,169	6,572***	8,910
any payments for security	7,020	900	6,120***	7,920
corruption as severe obstacle	5,590	782	4,808***	6,372
unofficial payments for government contracts	2,124	272	1,852	2,396
mean sales % paid as unofficial gifts	1.01	1.10	0.09***	1.02
in the country	(0.60)	(0.68)	(0.01)	(0.61)
mean proportion of firms seeking to influence laws	0.18	0.20	0.01***	0.19
in the country	(0.06)	(0.06)	(0.00)	(0.06)
resources reallocation between departments	6,891	1,329	5,562***	9,220
mean % of private domestic ownership	88.49	53.97	-34.52***	85.14
	(29.97)	(42.98)	(0.77)	(33.09)
mean % of private foreign ownership	7.84	36.40	-29.44***	10.62
	(25.09)	(40.71)	(0.66)	(28.30)
mean % of gvt. ownership	0.42	6.96	-6.54***	1.06
	(3.67)	(23.09)	(0.20)	(8.23)
mean profit % reinvested subsequent year	47.87	49.20	1.34	47.97
	(38.69)	(38.55)	(1.39)	(36.68)
mean firm age (years)	13.92	15.22	-1.30***	14.05
	(15.33)	(18.21)	(0.37)	(15.67)
number of employees: 0-1	2,964	465	2,499***	3,429
2-49	11,171	782	10,389***	11,953
50-249	1,947	342	1,605***	2,289
250-9999	842	224	618***	1,066
total sales: less than 10 thousands euro	211	8	203***	219
10-19	418	22	396***	440
20-49	1,242	55	1,187***	1,297
50-99	1,523	76	1,447***	1,599
100-249	2,507	161	2,346***	2,668
250-499	1,863	158	1,705**	2,021
500-999	1,623	174	1,449	1,797
1,000-1,999	1,203	172	1,031***	1,375
2,000-4,999	1,155	204	951***	1,359
5,000-9,999	532	85	447***	617
10,000-19,999	379	88	291***	467
20,000-49,999	310	71	239***	381
more than 50,000	234	82	152***	316

Note: Standard deviation in brackets. Significance levels: *: 10% **: 5% ***: 1%

resolve overdue payments in the previous 3 years, while less than half of other firms had to do so. Moreover, JVs more often pay for their security, and perceive corruption as a moderate or major obstacle for the operation and growth of their business. Compared to other firms, JVs also state more often that they frequently, usually, or always need to make unofficial payments or gifts to obtain government contracts. More than 57% of JVs are member of a business association or chamber of commerce, while only 45% of other firms are. The corporate governance structure of JVs seems to be associated with larger gifts to public officials and greater influence seeking at the country level.[6]

Our dataset also provides some evidence that the JV structure is more likely to be chosen by firms that face pressures for the internal re-allocation of resources. Reallocation of responsibility and budgetary resources between departments is much more common for JVs than for other firms. Indeed, 66% of JVs had over the previous 3 years some or major reallocations of responsibility and resources between departments or a completely new organizational structure, while this happened for 41% of other firms.

There is also some evidence in favor of the model's prediction that JVs manage to reinvest a larger share of their profits. In our BEEPS data we find that the percentage of profit reinvested in the subsequent year is 3% larger in JVs than in other firms.

Finally, Table 3 also shows that on average firms that are part of a JV have been operating 10% longer than other firms. Finally, they tend to be larger, in terms of both total sales and number of permanent full-time employees.

While some characteristics of the phenomenon have already emerged from the simple exploration of the data, a multivariate analysis is clearly necessary to investigate the choice of JV structure. We estimate a probit model, where the dependent variable is whether a firm is part of a JV or not (Table 4). Column [1] reports the estimates using country fixed effects, while in column [2] we use regional fixed effects. Column [3] does not include geographical controls. The results are qualitatively very similar.

Confirming the findings of our descriptive statistics, firms operating in contexts where external and internal pressure may be greater are more likely to choose a JV structure. In particular,

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[6]Countries' average percentage of total annual sales paid as unofficial gifts to public officials is calculated based on interviewed firms' answers. We similarly compute average tendencies to seek to influence the content of laws at the country level.

Table 4: Determinants for a JV Corporate Governance Structure to be chosen.

	[1]	[2]	[3]
resources reallocation between departments	0.315***	0.279***	0.301***
	(0.043)	(0.040)	(0.034)
any overdue payments to resolve	0.158***	0.202***	0.162***
	(0.045)	(0.054)	(0.047)
business association member	0.198***	0.269***	0.302***
	(0.068)	(0.060)	(0.071)
pay for security	0.087***	0.072**	0.070**
	(0.033)	(0.032)	(0.031)
court cases as defendant	0.010**	0.009*	0.006
	(0.004)	(0.005)	(0.006)
sales % from mining and quarrying sector	0.003	0.003	0.003
	(0.002)	(0.002)	(0.002)
sales % from construction sector	-0.003***	-0.004*	-0.004***
	(0.002)	(0.001)	(0.001)
sales % from transport sector	0.002*	0.002	0.001
	(0.001)	(0.001)	(0.001)
sales % from wholesale, retail sector	-0.002**	-0.001	-0.002**
	(0.001)	(0.001)	(0.001)
sales % from real estate sector	-0.001	-0.001	-0.001
	(0.001)	(0.001)	(0.001)
sales % from hotel sector	-0.004***	-0.004***	-0.004***
	(0.001)	(0.001)	(0.001)
sales % from other sector	-0.002	-0.002	-0.002*
	(0.001)	(0.001)	(0.001)
firm age	-0.001	-0.001	-0.001
	(0.001)	(0.001)	(0.001)
2-49 employees	0.041	-0.060	-0.057
	(0.051)	(0.048)	(0.046)
50-249 employees	0.468***	0.496***	0.503***
	(0.071)	(0.071)	(0.076)
250-9999 employees	0.631***	0.600***	0.606***
	(0.080)	(0.082)	(0.084)
intercept	-1.908***	-2.279***	-2.118***
	(0.212)	(0.166)	(0.096)
time dummies	yes	yes	yes
country dummies		yes	
region dummies			yes
N	14,769	13,690	13,690
Log-likelihood	-4336	-4015	-3882

Note: Robust Standard Errors in brackets, clustered by country. Significance levels: *: 10% **: 5% ***: 1%

we note a greater propensity to form JVs among enterprises that suffer higher than average difficulties dealing with the external environment (as proxied by having overdue payments to resolve), that are involved as defendants in court cases, that have to pay for security, and that belong to a business association.

We also find some evidence of a greater incidence of JVs in contexts where internal pressure

Table 5: Determinants for a JV Corporate Governance Structure with Instrumental Variables.

	[4]	[5]
Second stage: JV		
resources reallocation between departments	2.056***	
	(0.100)	
any overdue payments to resolve		1.656***
		(0.179)
sales % from construction sector	-0.001**	-0.004***
	(0.001)	(0.001)
2-49 employees	-0.125***	-0.112***
	(0.032)	(0.040)
50-249 employees	-0.267**	0.106
	(0.135)	(0.117)
250-9999 employees	-0.339**	0.129
	(0.161)	(0.139)
intercept	-1.101***	-2.201***
	(0.294)	(0.158)
	yes	
	yes	yes
First stage:	resources reallocation	overdue payments
firm % seeking to influence laws in country	0.290**	0.726***
	(0.124)	(0.263)
sales % from construction sector	-0.000	0.001
	(0.000)	(0.000)
sales % from wholesale, retail sector	-0.000**	-0.001***
	(0.000)	(0.000)
sales % from hotel sector	-0.001***	-0.002***
	(0.000)	(0.000)
2-49 employees	0.079***	0.107***
	(0.014)	(0.013)
50-249 employees	0.268***	0.229***
	(0.022)	(0.021)
250-9999 employees	0.343***	0.297***
	(0.026)	(0.032)
intercept	-0.077***	-0.340***
	(0.024)	(0.046)
time dummies	yes	yes
region dummies	yes	yes
Wald test of exogeneity	15.81***	19.57***
ρ	0.903***	0.682***
	(0.069)	(0.101)
N	14,277	14,368
Log-likelihood	-13836	-13783

Note: Robust Standard Errors in brackets, clustered by country. Significance levels: *: 10% **: 5% ***: 1%

may be stronger, as for instance when reallocation of resources between departments is more likely.

While the coefficients proxying external and internal pressure are large and significantly

different from zero in Table 4, these variables are likely to be endogenous. The coefficients are likely to be biased downwards, since although JVs are more necessary when a firm is under potential lobbying pressure, they should also serve to reduce the effects of such pressure. However, it seems important to test this conjecture more directly.

For this reason, in Table 5, we use instrumental variables to predict the vulnerability of firms to internal and external pressure, and we remove the firm-level lobbying variables which may be endogenous for similar reasons. We use the percentage of firms seeking to influence laws in the country as a proxy for country-level lobbying pressure; we also use sectoral controls as excluded instruments, except a dummy for the construction sector which we enter in the main equation since that sector has much lower joint venture frequencies than other sectors. We do not have enough good instruments to allow us to instrument simultaneously for both internal resource reallocation and overdue payments (the algorithm for maximum likelihood estimation in Stata does not converge), so Table 5 reports the results of estimating for each while excluding the other. Obviously this cannot help to decide whether internal or external pressures are more important.

Table 5 shows, as we conjectured, that the two endogenous regressors become much more significant when instrumented. This result is consistent with the idea that JVs can help to protect firms against both external and internal pressures, and are therefore more likely to be chosen when these pressures are present. Indeed, the role played by internal resource reallocation (column [4]) and overdue payments (column [5]) as determinants of JV status is stronger when their likely endogeneity is taken into account - a result that would be expected if the effect of joint ventures is to better to resist internal and external pressure to pay out early revenues.

In conclusion, to the extent that internal resource reallocation and overdue payments can serve as proxies for internal and external pressures respectively, the BEEPS data provide some supporting evidence that when either internal or external interest groups are effective, the corporate governance structure of a JV is more likely to be chosen. This is a long way from constituting a rigorous test of the model, but it provides suggestive corroborating evidence that the model's main conclusions are not evidently at odds with the data we have been able to gather.

6   Conclusions

This paper investigates an unexplored rationale for organizations to enter into joint ventures, namely the fact that a JV structure may provide a commitment mechanism enabling more efficient levels of investment.

In our theoretical framework internal or external interest groups may pressurize owners into paying out early revenues from such investments when the autocorrelation of productivity implies they should be reinvesting them in the project. The main predictions are that in the presence of effective lobby groups, JVs help the firm to resist their pressure.

While not claiming to provide any kind of rigorous test of this hypothesis, we have found illustrative corroborating evidence in case studies of infrastructure projects in developing countries, and in the investigation of the determinants of joint venture status in a large dataset of Business Environment and Enterprise Performance Surveys. We find that firms operating in contexts where external or internal pressure are likely to be greater choose a JV structure more often than other firms.

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